

## THE IDENTIFICATION OF CULTIVATED PLANTS

### I. A GENERAL COMMENTARY ON BOTANICAL IDENTIFICATION

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The value of the correct determination of the identity of unknown plants cannot be over-emphasized, and botanical identification in general is about the most immediately rewarding branch of taxonomic research. However, it has for long been bedevilled with some serious misconceptions and erroneous presentational procedures which seem to have driven most taxonomists away from it. For instance, the fact that some taxonomists insist on the use of minutiae of plant characters (particularly from the flower) in key-construction has given other taxonomists as well as the users of those keys the wrong impression that all plant characters are difficult to observe. Furthermore, the use of ambiguous descriptive terms in keys led to different personal interpretations and, consequently, to chaotic and contradictory identifications. Another disconcerting feature of botanical keys to date is the definition of the contrasted pair of entries in the same couplet using different characters, thus rendering the comparison between them almost impossible. For example, it is not infrequent to find that one entry in the key is defined by one or a few features from the leaves while its alternative in the same couplet is diagnosed by a set of petal or stamen characters. These and many more of the common ills of botanical identification have been discussed in some detail by numerous authors (e.g. Davis and Heywood, 1963; Lawrence, 1959; Morse, 1971; Porter, 1959; Swingle, 1946), but they continue to feature prominently in identificatory keys up to the present.

Furthermore, the identification of cultivated plants has so far been grossly neglected: nearly all taxonomists concerned with botanical identification have concentrated their efforts on wild plants (which might be of some potential economic value), so that hardly any part of the world is not covered now by at least one floristic study. In doing so, they have unduly overlooked the much fewer

(and hence more manageable) plants which are currently in cultivation, although some of these plants (e.g. legumes, cereals) seem indispensable for the livelihood of mankind. This obvious escape of taxonomists from tackling this evidently remunerative subject may well be due to the following:

(i) The work with cultivated plants is mostly carried out at the infra-specific, specific or (at best) generic levels, and there is generally no denial that the lower the hierarchical rank of the taxa under investigation the narrower the range of variation in their characters becomes. This means that the discovery of the variation needed for the discrimination between the various taxa would be beset with more difficulties when dealing with, say, the different varieties of wheat than with the genera and species of the Gramineae as a whole.

(ii) The range of variation suitable for use as basis for key-construction is further limited by the fact that the characters of cultivated plants are mostly unstable and liable to change with the change in environmental conditions. However, this phenomenon is by no means applicable to all aspects of variation in cultivated plants, and if work is primarily concentrated on only those plants which have been in cultivation long enough for their characters to stabilize genetically, the keys based on them would at least be fairly reliable. In any case, further periodical revision of those keys is a necessity (the same as for wild plants), and should adequately cater for any alteration in the plants' attributes as well as for any new plants which might have been domesticated or produced by the hybridization of previously grown crops.

(iii) It has always been generally felt that identificatory keys for cultivated plants are 'short-lived' as they will remain valid only as long as the plants they incorporate are in current usage. In other words, the construction of identificatory keys for cultivated plants does not deserve the time and effort expended on it. But this view is refutable on the grounds that the value of knowing the correct identity of any cultivated plant is vitally essential to a wide variety of people ranging from the growers, breeders, users and those using the plant in the various fields of scientific research.

(iv) If the scope of identification of cultivated plants is expanded so that the work is carried out without any geographical limitations imposed on the choice of plants, there is the difficulty of acquiring specimens of these plants from the various parts of the world where they are grown. It is rather unfortunate that only a small minority of

of herbaria in the world keep specimens of cultivated plants; despite their evident economic importance, cultivated plants have for long been stigmatized as 'second-class' and unworthy of a place among the huge collections of wild plants in herbaria and seed collections. This curious fact can only mean that those interested in the identification of cultivated plants have to make additional efforts to collect their own specimens, and it seems that so far only very few taxonomists and plant collectors have been prepared to make these efforts.

(v) The basic problem of knowing the correct identity of the cultivated plants involved in a key prior to its construction seems formidable indeed. It also highlights the almost total lack of any records of the plants' characters and their correct and complete names. At present, it seems that one cannot ensure the true identity of an unknown variety or hybrid of cultivated plants except through the curiosity of its original producer; an exceedingly lengthy, time-consuming and laborious process which is not always possible or attainable to most users of cultivated plants.

In view of the foregoing remarks, a major project has been set up to construct non-indented dichotomous keys to cultivated members of such widely grown and economically important genera as Gossypium, Linum and Triticum. The keys to species and varieties of the former two genera have already been published (El-Gazzar et al, 1975 and 1976; Sallouma et al, 1975; Momtaz et al, 1976), while those covering the wheats will appear in subsequent numbers of this series. In this project, the plants' characters are recorded in a strictly comparative fashion. The resulting data-matrices are permanent records of the plants and their attributes, and can be readily subjected to future methods of key-generation as they come to light. Another novel feature of this project is the construction of alternative keys to the same group of plants, so that they may be used not only in their identification but also in the confirmation of that identification. Confirmatory keys of this sort have the added advantage of replacing the lengthy (and often far from comparative) descriptions which usually follow identificatory keys in most floristic works.

It seems that the identification of cultivated plants has a long way to go before catching up with the numerous improvements and innovations (e.g. data-banks and computer programs for key-generation; see Morse, 1968 and 1971; Goodall, 1968; Pankhurst, 1970a and b; Hall, 1970; Watson and Milne, 1972; Pettigrew and Watson, 1973) introduced to botanical identification but directed entirely to wild

plants. However, unless taxonomists begin to realize that the identification of cultivated plants has been unduly neglected for so long and that it is high time they devoted part of their efforts to it, one cannot possibly hope for any drastic changes in this unlikely state of affairs. With this in mind, our project seems to be a step in right direction, as it is meant to draw the attention of taxonomists, agronomists and horticulturists to the almost total lack of identificatory means for the great majority of cultivated plants and to set an example of how easily this huge gap in taxonomic practice can be bridged.

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